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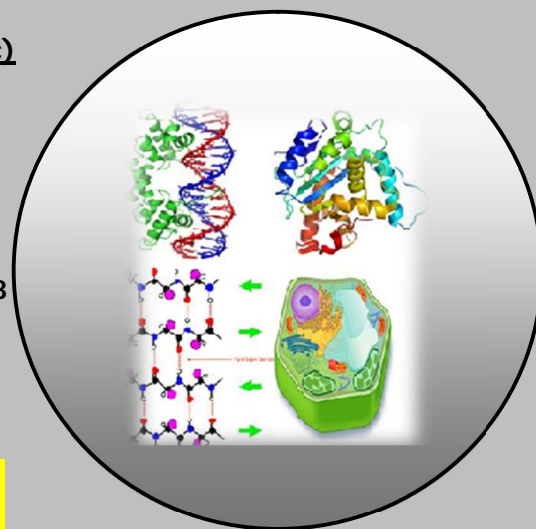
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RESEARCH PAPER

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# Snakes' Availability and its Biting Record in Rangpur Carmichael College, Bangladesh

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## ABSTRACT

*Rangpur Carmichael College is in the northern part of Bangladesh with 500 acre of land. Though in winter it is a severely cold place but in summer temperature ranges from 35°-37°C which is better atmosphere for the availability of snakes. Out of 13 snakes of elapidae family 2 were genera, 3 species and 2 subspecies. In colubridae family 8 were genera and another 8 were at species and in typhlopidae family only 1 genus and another of species. Of the observed 3 families 30.77% were poisonous and about 69.23% non-poisonous. Around the principal's residence, students' hostel and the library there were small trees and huge bushes where snakes were available. Poisonous snakes and rust off were found. Moreover, south and west region a lot of crop lands were observed where house shrew, rat, mouse, termite, insects, lizards were adequate. Between the principal's residence and Crishno Mohan hostel there was a big and old Sacred Fig tree (*Ficus religiosa*) where cobra lived and created records of biting people. Biting record by *Naja naja naja* were in 4 where 1 dead and 3 safe. Only three water snakes were found in the big pond at the southern region of the college.*

**Key words:** Bangladesh, Rangpur Carmichael College and Snakes.

## INTRODUCTION

Rangpur is the divisional headquarters of northern regions of Bangladesh. Its temperature is high which could be a suitable place for the growth of snakes. Carmichael College is one of the good places for the snakes to live in because this is an old building having bushes here and there. The rats, huge insects and other small rodents available in the campus which are snakes' food. The tropical monsoon climate of Bangladesh is characterized by marked seasonal variations. In Bangladesh among the 82 species of total snakes 28 are venomous and 12 of them are sea snakes (Faiz et al., 2008).

There are 5 medically important groups of snakes in our country and these are cobra, krait, Russell's viper, green pit viper and sea snakes. Among these majorities of venomous bites in our country occur from cobras and kraits. Snake usually lives in the paddy field, river, hills, and roots of the tree, rat hole etc. Estimates indicate > 5 million bites annually by venomous snakes worldwide, with > 12, 5000 deaths (Paul et al., 2008). An early World Health Organization-funded study estimated about 8,000 cases of snakebite with over 20% mortality in Bangladesh annually. Most bites of cobra and krait in Bangladesh are recorded between May and October and the highest was in June. People who get the bite during day today occupational activity like cultivation, fishing, plantation, wood collection, watching the crops and garden lying or even during rural foot walk. Sometimes snakes bite in home surrounding while people take care of their chicken or pet birds (Daniel, 1983). In Bangladesh out of 98 species 32 species are venomous and 66 nonvenomous. Among them 28 species are categorized as threatened (IUCN 2000). The common snakes of the country are Checkered Keelback, *Xenochropis piscator*; Striped Keelback, *Amphiesma stolatum*; Banded Wolf Snake, *Lycodon aulicus*; Black-barred Kukri Snake, *Oligodon cinereus*; Copperhead, *Colelognatha radiatus*; Eastern Cat Snake, *Boiga gokool*, Smooth Water Snake, *Enhydris enhydris*, Rat Snake (*Ptyas* spp.), Python (*Python* spp.), Cobra (*Naja* spp.), King cobra (*Ophiophagus hannah*), Kraits (*Bungarus* spp.) and Sea Snakes (*Hydrophis* spp.). Snakes eat a huge quantity of live rodents annually that are usually considered as biological pest control agents to crop. Some research works on snakes have been done on the taxonomy, status and distribution, and epidemiological survey of snake-bite in Bangladesh (Ahsan 1998; Sarker and Sarker 1993; Khan 2004). The objective of this study is to identify the snakes in the college campus and takes some initiatives to save the people of the campus from snake biting. While sub-Saharan Africa faces a dramatic crisis in antivenom production and supply (Lalloo et al., 2002; Theakston and Warrell, 2000) shortage of antivenom is not the most pressing issue in South Asia. Despite these large volumes of production, several challenges persist that prevent appropriate management of snake bite victims in South Asia. Poor access to often inadequately equipped and staffed medical centres in rural areas, high cost of treatment, and inadequate use of antivenoms are major concerns (WHO, 2007; Simpson, 2008).

## MATERIAL AND METHODS

**Selected area:** In south there is a pond where water snakes are available. In north, east and library area there were some jungles. Around the campus there were huge crop lands with quarters and ancient buildings. In the time of 8:00-8:30 p.m. and 11:00-12:00 p.m. most of the snakes were found. Morning 8:00-8:30 there were less snakes in the campus, in students' Gopallal, Crishno Mohan and Osmania hostel adequate number of snakes were observed (Diagram1) (Plate 1, 2 and 3). Snakes were seen by naked eyes and the distance between the snake and observer were from 2 meters to 2 yards. The research was conducted from 2000 to 2007.

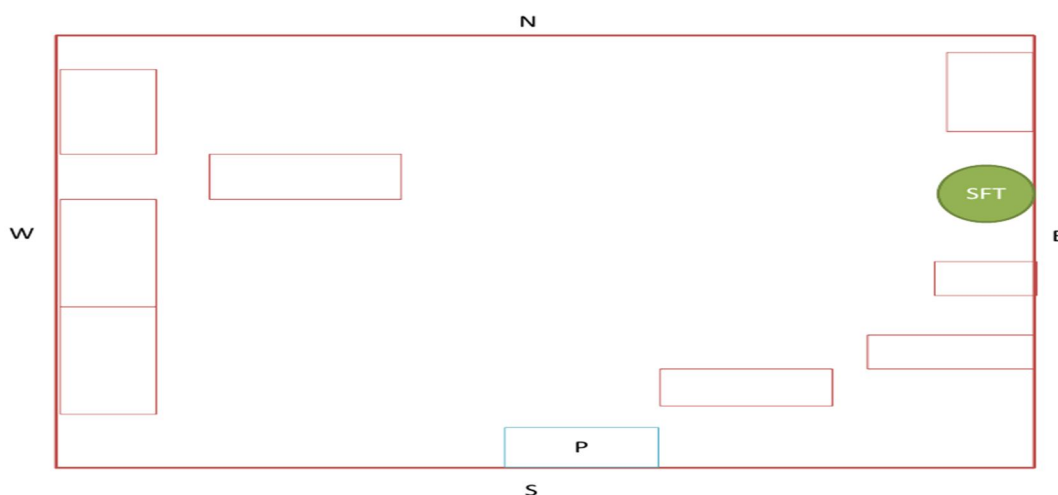
**Identification of the snakes:** Most of the dead snakes were collected from the Museum of the Zoology Department of Carmichael College. By the help of 'The book of Indian reptiles by Daniel (1983) and 'Protected Areas of Bangladesh- A Guide to Wildlife by Khan (2008) the snakes' species were identified thoroughly. During the time of walking at evening and night the snakes were available (Table 1). The distance between observer and snakes were sometimes maximum 2 meters.

## RESULTS

### Available snakes

**Monocled cobra:** The family Elapidae (Plate 5) is represented by at least 17 terrestrial species (including cobras, king cobras, kraits, and coral snakes) and numerous species of sea snakes in South Asia. Bites by cobras (*Naja* spp.), which are best known for raising their head and anterior body and spreading their neck as a hood in defense, typically occur outdoors in the late afternoon (Warrell 1995; Whitaker and Captain, 2004). In the northern and eastern parts of the Indian subcontinent, the monocellate cobra (*N. kaouthia*) also belongs to the medically important snakes.

**Spectacled cobra:** The spectacled cobra (*Naja naja*), (Plate 4) one of India's commonest snakes, causes numerous cases of envenoming every year (Kularatne et al., 2009). A third cobra species, *N. oxiana*, occurs in the northwest (Whitaker and Captain, 2004; Khan, 2002, Shah et al., 2004).



**Figure 1.** Available snakes are found in this mentioned area of Rangpur Carmichael College (ZD=Zoology Department, GLH=Gopallal Hostel, Q=Quarters, AB=Ancient Building, P=Pond, OH=Osmania Hostel, CMH=Crishno Mohan Hostel, SFT=Sacred Fig Tree, PR=Principal's Residence).

**Krait:** Kraits (*Bungarus* species) are slender, nocturnal snakes that often enter human dwellings at night in search of prey (Plate 6 and 7). When any krait bites a sleeping person, the local symptoms are generally not found. Case fatality rates of krait envenoming reach up to 77% – 100% without treatment (Warrell, 1995; Ahuja et al., 1954).





Plate 1



Plate 2



Plate 3



Plate 4



Plate 5



Plate 6



Plate 7



Plate 8



Plate 9



Plate 10



Plate 11



Plate 12



Plate 13



Plate 14



Plate 15



Plate 16



Plate 17

Traditionally, most krait bites (Plate 6 and 7) in South Asia have been attributed to the common krait (*Bungarus caeruleus*), however, in South Asia alone there are eight species of *Bungarus*, several of which are morphologically similar to *B. caeruleus*. Several studies have demonstrated that a number of these are medically important in the region (Harris et al., in press; de Silva et al., 1993; Green, 1908; Wall, 1910). Common krait is very aggressive at night but very docile creature during the day (Kularatne Sam, 2002). **Rat snake:** Rat snakes (*Ptyas* species, *Coelognathus* species) (Plate 8 and 9) are large, rapidly moving snakes that are often confused with cobras. Most notoriously, several genera of small nonvenomous snakes share the same colour pattern as kraits (Desilva, 1990).

**Wolf snake:** Wolf snakes (*Lycodon* spp) are of particular concern in this regard because some of them (*Lycodon aulicus*) are very common (Plate 10) inside and around houses and bite aggressively if disturbed (Harris et al, in press). This is non-poisonous and most common snakes in any village. This is nice in colour, narrow and small snake. This snake is useful for insect control.

**Water snakes (*Atretium schistosum*, *Xenochrophis piscator*, *Enhydris enhydris*):** All are very common in everywhere and non-poisonous. *A. schistosum* (Plate 11) is black in colour, *X. piscator* (Plate 12) is yellow with black spotted and *E. enhydris* (Plate13) is ash. All are small in length and only *X. piscator* is moderately long when it shows maximum age.

**Striped Keelback:** This snake is very common in grassy land (Plate 14) and besides river or ponds. Its stripe from the neck to tail is remarkable. This is non-poisonous and slightly aggressive. It is narrow and small in length.

**Bronzeback Tree Snake:** It is a long and slender snake with a pointed head with bronze coloured (Plate 15). It feeds on lizards and frogs. This is a venomous snake which prefers to live on trees rather than on ground. This is very active snake, restless and a quick, both on the ground as well as in the tree. It also occasionally takes birds as food. This oviparous snake lays 6-7 eggs between September-February and hatch 4-6 weeks after laying. And the gestation period is 4-6 months.

**Common Vine Snake:** This green coloured vine snake is diurnal and mildly venomous (Plate 16) and feeds on frogs and lizards. They are slow moving, relying on camouflaging as a vine in foliage and pumpkin garden. They may open their mouth in threat display and point their head for defense. The species is viviparous, giving birth to young that grow within the body of the mother, enclosed within the egg membrane. The venom is mild and causes swelling. Symptoms will subside within three days.

**Blind Snake:** Known as a Common Blind Snake, this is the most common snake species all over Bangladesh (Plate 17). It looks like a shiny black earthworm. It has a small forked tongue and not often seen. It is very harmless with silky texture scales. This species is a truly blind snake. There is no vestigial eye and the head is smooth. It lives most of its life underground in moist soil hunting for tiny soil invertebrates. This species is suspected to be parthenogenetic snake, meaning that the female can reproduce and lay eggs without having been mated with a male.

**Feed for snakes:** In the college campus there were a lot of house shrew, field mouse, house mouse, termite, insects, and cockroach and wall lizards. Moreover, huge crop lands mainly rice, wheat and corn plants were available around the campus.

**Table 1. Following table showing all about snakes and its status.**

Name of snakes	Family	Status	When available	Biting records
1. Spectacled Cobra- <i>Naja naja naja</i> , Linnaeus 1758	Elapidae	Poisonous	8:00-8:30 p.m.	4 (1 die and 3 safe)
2. Monocled cobra- <i>Naja naja kaothia</i> , Lesson 1831	Elapidae	Poisonous	8:00-8:30 p.m.	None
3. Common Krait- <i>Bungarus caeruleus</i> , Schneider 1801	Elapidae	Poisonous	11:00-12:00 p.m.	None
4. Lesser Black Krait- <i>Bungarus lividus</i> , Cantor 1839	Elapidae	Poisonous	11:00-12:00 p.m.	None
5. Common Rat Snake- <i>Ptyas mucosa</i> , Linnaeus 1758	Colubridae	Nonpoisonous	8:00-8:30 p.m.	None
6. Common Wolf Snake- <i>Lycodon aulicus</i> , Linnaeus 1758	Colubridae	Nonpoisonous	8:00-8:30 a.m.	None
7. Olivaceous Keelback- <i>Atridium schistosum</i> , Daudin 1803	Colubridae	Nonpoisonous	8:00-8:30 a.m.	None
8. Checkered Keelback- <i>Xenochrophis piscator</i> , Schneider 1799	Colubridae	Nonpoisonous	8:00-8:30 a.m.	None
9. Schneider's Smooth Water Snake- <i>Enhydris enhydris</i> , Schneider 1799	Colubridae	Nonpoisonous	8:00-8:30 a.m.	None
10. Striped Keelback- <i>Amphiesma stotatum</i> , Linnaeus 1758	Colubridae	Nonpoisonous	8:00-8:30 a.m.	None
11. Daudin's Bronzeback Tree Snake- <i>Dendrelaphis tristis</i> , Daudin 1803	Colubridae	Nonpoisonous	8:00-8:30 a.m.	None
12. Common Vine Snake- <i>Ahaetulla nasutus</i> , Lacepede 1789	Colubridae	Nonpoisonous	8:00-10:00 a.m.	2
13. Common Blind Snake- <i>Typhlops vermicularis</i> , Merrem 1820	Typhlopidae	Nonpoisonous	6:00-8:00 a.m.	None

## DISCUSSION

India has the highest number of deaths due to snake bites in the world with 35,000–50,000 people dying per year according to World Health Organization (WHO) direct estimates (Warrell, 1999; Kasturiratne et al., 2008). In Pakistan, 40,000 bites are reported annually, which result in up to 8,200 fatalities (Kasturiratne et al., 2008; Ali, 1990). In Nepal 1,000 recorded death and Sri Lanka, around 33,000 envenomed snake bite victims are reported annually from government hospitals (Kasturiratne et al., 2008; Kularatne, 2003). A postal survey conducted in 21 of the 65 administrative districts of Bangladesh estimated an annual incidence of 4.3 per 100,000 populations and a case fatality of 20% (Sarker et al., 1999).

In United States there are 200 species of snakes and 170 are nonpoisonous. Snakes are classified as non- game animal. Surveys in rural Sri Lanka showed that hospital data record less than half of the deaths due to snakebite (Sawai, 1984 and Fox et al., 2006). Snake bite is an important occupational injury affecting farmers, plantation workers, herders, and fishermen. Open-style habitation and the practice of sleeping on the floor also expose people to bites from nocturnal snakes (Alirol et. al., 2010). Meantime of interval between bite and hospitalization was 8 hours. 94% bites occurred in land and 7% in water. In Mymensingh this incidence was in July-August. Sometimes patients were admitted in hospital with suspicion of bitten by snakes, most of them are not case of snake bite. Least incidences of snake bite in November to March which is almost similar to the result of northern regions of Bangladesh (Islam et al., 1999). Most of the snakes in Chittagong are cobra which is 13.83%. In our region other common snakes are krait (Miah et al., 2009). The incidence of snake bites is higher during the rainy season and during periods of intense agricultural activity (Suleman et al., 1998; Ariaratnam et al., 2008). Most of the common peoples believe that all snakes are harmful and unpleasant, as a result when a snake comes to the sight of a man it must be killed instantly (Azam et al., 2011). Most of the venomous snakebite was by Krait (77.78%). Kraits are ophiophagous, preying primarily upon other snakes. They are more docile during the daylight hours; at night they become very active, but are not very aggressive even when provoked. If bitten by it in sleep the victim seldom comes to know as the bite feels more like an ant bite or a mosquito bite. *Bungarus* species have highly potent neurotoxic venom which can induce muscle paralysis. Clinically, their venom contains mostly pre-synaptic neurotoxins. Following envenomation with bungarotoxins, transmitter release is initially blocked (paralysis), followed by a period of massive over excitation (cramps, tremors, spasms), which finally tails off to paralysis (Mondal et al., 2011). Majority of the bite in lower limb was 66.67% but 65.95% in other study (Bakar et al., 2006). Ligatures had been applied in 93.69% (Mondal et al., 2011). Tota Mia, a snake charmer, set up a rearing center in his home yard in Thakurgaon district. He collected snakes illegally from nature. In 2008 he died due to a Cobra (*Naja kaouthia*) bite, when he was performing display of snakes in his home yard. After the incident Forest Department rescued 67 snakes from his collection and released them in nature and also a case was filled in the court against the other accused. Another case was detected in 2010 of illegal collection and rearing of 90 numbers of Cobra, Rat Snake, Vine Snake, Common Krait and Banded Krait in Rajshahi. As per the owners opinion these snakes were collected for conservation purposes. The enforcement authority (Forest Department) sued a file against the accused person and seized the snakes, which are now under the custody of Forest Department. In these two snake-rearing cases, the snakes were reared in the earthen pots and in small brick tanks without controlling moisture, temperature and humidity, sanitation, and food and feeding were not scientifically managed (Azam et al., 2011). All snake collectors and exporters must be licensed from the Directorate General of Forest Protection and Nature.



## CONCLUSION

Increased attention and means should be dedicated to snake bite envenoming by researchers, funding agencies, pharmaceutical industries, public health authorities, and supranational organizations, as all have contributed to keeping this important public health problem a truly neglected disease. Snakes are legally protected by the act and there is no snake farm in Bangladesh. The control measures and management program is not existing. If we consider the college campus for snakes' sanctuary our crops field will be free of insecticide. So that our health will be ensure for such kind of insecticidal diseases. And for tree snake some medium trees can be planted for their proper shelter. Only three biting records of these snakes within and around the campus where one case was dead and others two were safe. Need to protect to this area for snakes soon and more research is important.

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## REFERENCES

- Ahsan, M.F. 1998. Country report for Bangladesh-Herpetofauna of Bangladesh: present status, distribution and conservation. In: A. de Silva (ed), Biology and conservation of the amphibians, reptiles and their habitats in South Asia (Proceedings of the International Conference on the Biology and Conservation of Amphibians and Reptiles of South Asia, Sri Lanka, August 1-5, 1996).
- Ahuja, M.L. and Singh, G. 1954. Snake bite in India. *Indian J Med Res.* 42:661–686.
- Ali, Z. 1990. Snake bite: a medical and public health problem in Pakistan. In: Gopalakrishnakone, P., Chou, .LM. editors. Snakes of medical importance (Asia Pacific region) Singapore. National University Singapore pp. 447–461.
- Alirol, E., Sharma, S.K., Bawaskar, H.S., Kuch, U. and Chappuis, F. 2010. Snake bite in south Asia: A review. *PLoS Negl Trop Dis.* 4(1):e603.
- Ariaratnam, C.A., Sheriff, M.H., Theakston, R.D. and Warrell, D.A. 2008. Distinctive epidemiologic and clinical features of common krait (*Bungarus caeruleus*) bites in Sri Lanka. *Am J Trop Med Hyg.* 79:458–462.
- Azam, M.S., Alam, S.S. and Shah, M.R. 2011. Country report of Bangladesh on CITES Asian Snake Trade Workshop. Guangzhou, China, 11-14.

- Bakar, A., Ahasan, N. and Ahsan, M. 2006. Snake bite in Bangladesh. *Pak Armed Forces Med J.* 56(1): 68-72.
- Daniel, J.C. 1983. The book of Indian Reptiles. Bombay Natural History Society, Oxford University Press.
- De Silva, A., Mendis, S. and Warrell, D.A. 1993. Neurotoxic envenoming by the Sri Lankan krait (*Bungarus ceylonicus*) complicated by traditional treatment and a reaction to antivenom. *Trans R Soc Trop Med Hyg.* 87:682–684.
- De Silva, A. 1990. Colour guide to the snakes of Sri Lanka. Portishead, UK: R & A Publishing Ltd.
- Faiz, M.A., Hossain, M., Amin, R., Ghose, A. and Basher, A. 2008. National guideline of management of snake bite. 2nd edition, Dhaka: DGHS.
- Fox, S., Rathuwithana, A.C., Kasturiratne, A., Lalloo, D.G. and De Silva, H.J. 2006. Underestimation of snakebite mortality by hospital statistics in the Monaragala District of Sri Lanka. *Trans R Soc Trop Med Hyg.* 100: 693–695.
- Green, E.E. 1908. Note on the death of a ecology from snake-bite. *Spolia Zeylanica* 5:103.
- Harris, J.B., Faiz, M.A., Rahman, M.R., Jalil, M.A. and Ahsan, M.F. Snake bite in Chittagong Division, Bangladesh: a study of bitten patients who developed no signs of systemic envenoming. *Trans R Soc Trop Med Hyg.* In press
- Islam, Q.T., Faiz, M.A., Azhar, M.A., Ekram, A.R.M.S. and Alam, M.T. 1999. Snake bite in the northern Bangladesh: a hospital based study of 68 cases. *TAJ*, 12: 135-138.
- IUCN- Bangladesh, 2000. Red Book of Threatened Amphibians and reptiles of Bangladesh. IUCN- The World Conservation Union. XII+95pp.
- Kasturiratne, A., Wickremasinghe, A.R., De Silva, N., Gunawardena, N.K. and Pathmeswaran, A. 2008. The global burden of snakebite: a literature analysis and modelling based on regional estimates of envenoming and deaths. *PLoS Med.*5:218.
- Khan, M.A.R. 2004. Checklist of the herpetofauna of Bangladesh. *Cobra* 57:1-29.
- Khan, M.M.H. 2008. Protected areas of Bangladesh A guide to wildlife. Nishorgo Program, Bangladesh Forest Department, Dhaka, Bangladesh.
- Khan, M.S. 2002. A guide to the snakes of Pakistan. Frankfurt am Main, Germany: Chimaira
- Kularatne Sam. 2002. Common krait (*Bungarus caeruleus*) bite in Anuradhapura, Sri Lanka: a Prospective Clinical Study, 1996-98. *Postgrad. Med. J.*, 78, 276-80.
- Kularatne, S.A. 2003. Epidemiology and clinical picture of the Russell's viper (*Daboia russelii russelii*) bite in Anuradhapura, Sri Lanka: a prospective study of 336 patients. *Southeast Asian J Trop Med Public Health* 34:855–862.
- Kularatne, S.A., Budagoda, B.D., Gawarammana, I.B. and Kularatne, W.K. 2009. Epidemiology, clinical profile and management issues of cobra (*Naja naja*) bites in Sri Lanka: first authenticated case series. *Trans R Soc Trop Med Hyg.* 103:923–930.
- Lalloo, D.G., Theakston, R.D. and Warrell, D.A. 2002. The African challenge. *Lancet.* 359:1527.
- Miah, M.T., Hoque, A.A., Tarafder, B.K., Patwary, M.K.H., Khan, R.R. and Kabir, S.M.E.J. 2009. Epidemiology, clinical profile and outcome of patients of snake bite in Mymensingh Medical College Hospital. *J Bangladesh Coll Phys Surg.* 27(2):70-75.

- Mondal, R.N., Rani, M., Nurmohammad, Islam. M.M., Islam, M.S., Saha, A.C., Hossain, M.Z., Paul, S., Auerbach Robert, L. and Norris, 2008. Disorders Caused by Reptile Bites and Marine Animal Exposure. In Fauci AS, Braunwald E, Kasper DL editors. Harrison's Principles of Internal Medicine. 17th edition. New York: The McGraw- Hill Companies. 2741-2748.
- Rabies and Envenomings, A neglected public health issue. Geneva: WHO 2007. Richard Mastenbroek. Kraits [Internet] Available from:<http://web.archive.org/web/20090213222149/http://kingsnake.com/elapids/kraits.htm>
- Sarker, N.J. and Sarker, S.U. 1993. Observation of some snakes of Bangladesh. Tiger paper. 20 (3): 17-21.
- Sarker, M., Sarker, N. and Patwary, S. 1999. Epidemiological survey of snake bite incidences in Bangladesh. Dhaka University *J Biol Sci.* 8:53–68.
- Sawai, Y. 1984. Study on deaths due to snakebite in Anuradhapura District, Sri Lanka. The Snake.16:7–15.
- Shah, K.B. and Tiwari, S. 2004. Herpetofauna of Nepal – a conservation companion. Kathmandu, Nepal: The World Conservation Union.
- Simpson, I.D. 2008. The “worldwide shortage” of antsnake venom: is the only right answer “produce more” or is it also “use it smarter?”. *Wilderness Environ Med.* 19:99–107.
- Simpson, I.D. and Norris, R.L. 2007. Snake antivenom product guidelines in India: “the devil is in the details”. *Wilderness Environ Med.* 18:163–168.
- Suleman, M.M., Shahab, S. and Rab, M.A. 1998. Snake bite in the Thar Desert. *J Pak Med Assoc.* 48:306–308.
- Theakston, R.D. and Warrell, D.A. 2000. Crisis in snake antivenom supply for Africa. *Lancet.*356:2104.
- Wall, F. 1910. Notes on snakes collected in upper Assam. Part II. *J Bombay Nat Hist Soc.* 19:825.
- Warrell, D.A. 1995. Clinical toxicology of Snake bites in Asia. In: White MA, editor. Handbook of clinical toxicology of animal venoms and poisons. CRC Press pp. 493–588.
- Warrell, D.A. 1999. WHO Guidelines for the clinical management of snake bites in the South East Asia Region. *SE Asian J Trop Med Publ Health* 30: 1–83.
- Whitaker, R. and Captain, A. 2004. Snakes of India, the field guide. Chengalpattu, India: Draco Books.

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